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GENERAL REQUIREMENTS FOR ROTATING ELECTRICAL MACHINERY FOR AIRCRAFT

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GENERAL REQUIREMENTS FOR ROTATING ELECTRICAL MACHINERY FOR AIRCRAFT

0. FOREWORD

0.1 This Indian Standard was adopted by the Indian Standards Institution on 28 September 1978, after the draft finalized by the Aircraft Electrical Equipment Sectional Committee had been approved by the Electrotechnical Division Council.

0.2 This standard is based on BS G102 ' General requirements for rotating electrical machinery ' issued by the British Standards Institution.

1. SCOPE

1.1 This standard specifies general requirements applicable to rotating electrical machines for aircraft. This standard is to be used in conjunction with individual equipment specifications.

2. TERMINOLOGY

2.1 For the purpose of this standard, the definitions given in the individual specifications for the rotating electrical equipment shall apply.

3. DECLARATION OF DESIGN AND PERFORMANCE

3.1 The equipment manufacturer shall furnish information on the design and performance of the equipment and any limitations which are applicable in the standard form of declaration as specified in IS : 7855-1975*. Technical information on the installation, testing, calibration, maintenance, overhaul and repair shall also be furnished, indicating the recommended life or overhaul period.

4. GENERAL REQUIREMENTS

4.1 Materials — All materials used shall be suitable for their intended purposes. They shall have low flammability and shall be capable of maintaining their essential properties during service and storage. The structural and consumable materials (for example lubricants) used shall be according to relevant Indian Standards. Material liable to rapid deterioration in service shall not be used. All metallic materials shall be resistant to corrosion or suitably treated to resist corrosion.

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*Forms for declaration of performance of aircraft electrical equipment.

4.2 Construction

4.2.1 All items of equipment shall be designed for minimum mass and bulk consistent with reliability in aircraft service and shall be sound and suitable for the declared purposes.

4.2.2 Bearings and methods of lubrication shall be selected for conforming to the declaration of life. The design of the bearings shall be such that they are not likely to be affected deleteriously by foreign matter such as brush-dust. Ball and roller bearings shall be so selected that there is a radial internal clearance within the bearing under all operating conditions.

4.2.3 Allowance for differential expansion shall be made in machine.

4.2.4 Spinning of the bearings in their housing shall be prevented but slight rotational creep shall be permissible if it has no deleterious effect.

4.2.5 The quantity, type and method of lubrication of fluid lubricated bearings shall be as required by the individual equipment specification. Provision shall be made for preventing undue loss of the grease contained in grease-lubricated bearings.

4.3 Brush-Gear

4.3.1 Brush-gear shall be of rigid construction and dimensionally stable throughout its life. The creepage path between live parts of different polarity, and between live parts and the frame, shall be such as to ensure that leakage currents due to the accumulation of brush or other contaminants will not give rise to a dangerous condition. A suitable coating of insulation shall be applied to the surface of all earthed metal in the vicinity of the brush-gear.

4.3.2 The design of the brush-gear shall be such that the brush is adequately supported under all conditions of wear of brush or commutator, and that adequate spring pressure is maintained throughout the life of the brush. The internal surface finish of the brush-holders shall be such that the brushes slide freely under all operational conditions. Springs and triggers shall not jam or foul the brush-holders due to wear over the declared wearing length of the brush. Brush-flexibles shall not restrict the travel of the brushes and shall not foul the springs.

4.3.3 Brushes shall be replaceable without dismantling the machine, and shall be insertable in one way only. They shall be marked to indicate how much of the usable length is left. Flexibles shall be provided on the brushes that are rated to carry more than 200 mA continuously or correspondingly higher limiting current intermittently. The flexible shall be insulated, where necessary.

4.3.4 Provision shall be made for adjustment of the brush position for the best performance, unless the relative location of commutator segments, armature slots and brush-gear, etc, is adequately controlled in production to achieve the same result.

4.3.5 The dimensions of the brushes and brush-holders shall comply with the individual equipment specification.

4.4 Rotor Balance — The dynamic unbalance of rotors shall not exceed 2·5 mm/kg.

4.5 Commutators and Slip Rings

4.5.1 Care shall be taken during manufacture to ensure that the commutator or slip ring working surfaces are concentric with the bearing journals. With the armature supported at its journals on vee-blocks, the maximum variation in reading on a dial gauge resting on the commutator or slip-ring surface shall not exceed 25 µm for peripheral speeds up to 1 800 m/min or 12 µm for higher speeds. The maximum variation in reading between any two adjacent segments of commutator shall not exceed 2·5 µm.

4.5.2 When commutator micas are recessed, care shall be taken in recessing operation to ensure that the recess is in line with the inter-segmental slot and that no fragment of mica is left standing above the bottom of the slot. Each recess shall be sufficiently deep to allow for commutator wear between overhauls.

4.5.3 The quality of commutator shall be assessed visually under extreme conditions of load and speed according to IS : 4722-1968*.

5. SAMPLING

5.1 The sampling scheme and criterion for conformity shall be given in the individual equipment specifications.

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*Specification for rotating electrical machines.

INDIAN STANDARDS
ON
AIRCRAFT ELECTRICAL EQUIPMENT

IS:	
2032 (Part XV)-1976	Graphical symbols used in electrotechnology: Part XV Aircraft electrical symbols
7854-1975	Voltages and frequency for aircraft electrical systems
7855-1975	Form of declaration of performance of aircraft electrical equipment
7856-1975	Safety features for ground power units for direct current aircraft servicing and engine starting
7857-1975	Aircraft-fuel nozzle grounding plugs and sockets
7915-1976	Dimensions for connections for aircraft ground electrical supplies
8252 (Part XVIII)-1978	Environmental tests for aircraft equipment: Part XVII Magnetic influence
8705-1978	Static invertors for aircraft
8706-1978	Safety features for ground power units for alternating current aircraft servicing
8834-1978	Dimensions for general purpose push-pull three-pole circuit breakers for aircraft
8946-1978	General requirements for rotating electrical machinery for aircraft
8980-1978	Dimensions for general purpose push-pull single-pole circuit breakers for aircraft